Center Independent Research & Development: JSC IRAD

EVA Suit Microbial Leakage Investigation

Completed Technology Project (2015 - 2016)

Project Introduction

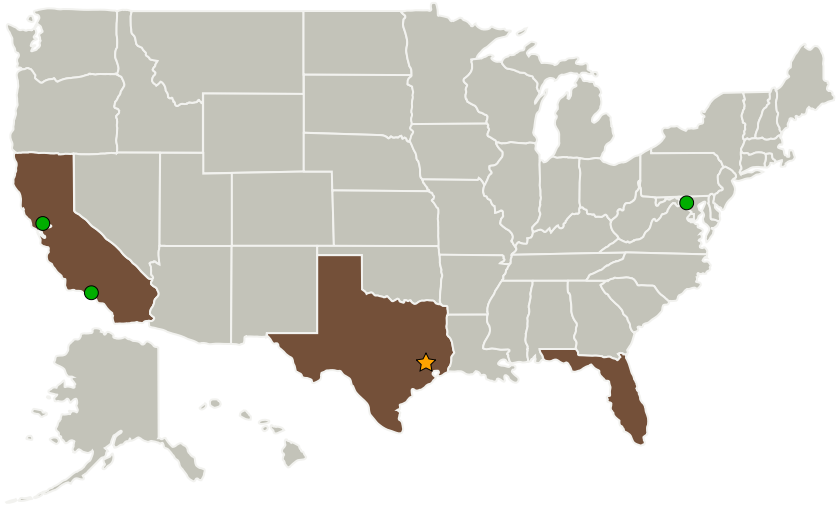
The objective of this project is to collect microbial samples from various EVA suits to determine how much microbial contamination is typically released during simulated planetary exploration activities. Data will be released to the planetary protection and science communities, and advanced EVA system designers. In the best case scenario, we will discover that very little microbial contamination leaks from our current or prototype suit designs, in the worst case scenario, we will identify leak paths, learn more about what affects leakage--and we'll have a new, flight-certified swab tool for our EVA toolbox.

NASA has a strategic knowledge gap (B5-3) regarding what life signatures leak/vent from our Extravehicular Activity (EVA) systems; this potentially impacts how we will search for evidence of life at exploration destinations. Funding will be used to fabricate and sterilize test consumables (swab tips), prepare Test Readiness Review products (such as materials compatibility and hazard assessments), certify the EVA Swab Tool, participate in test opportunities as they arise, and perform analysis on collected swabs.

Anticipated Benefits

Suit test data will help advanced suit designers develop strategies for planetary protection compliance. Characterization of suit microbial environment will also help quantify the effectiveness of suit cleaning processes and equipment between suit uses, which may be important for crew health.

Primary U.S. Work Locations and Key Partners



Form, Fit, and Function Testing of EVA Swab With Mark III Suited Subject

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Completed Technology Project (2015 - 2016)

Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
●Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
●Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland
●Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
University of California-Davis(UC Davis)	Supporting Organization	Academia	Davis, California
University of Florida	Supporting Organization	Academia	Gainesville, Florida

Primary U.S. Work Locations	
California	Florida
Texas	

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Center Independent Research & Development: JSC IRAD

Project Management

Program Manager:

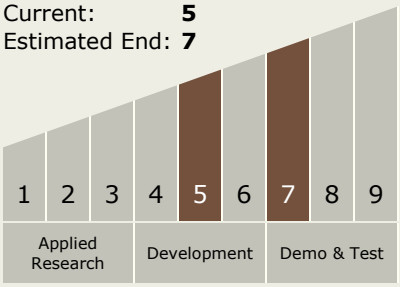
Carlos H Westhelle

Project Manager:

Michelle A Rucker

Technology Maturity (TRL)

Start: **5**
Current: **5**
Estimated End: **7**



Technology Areas

Primary:

Continued on following page.

EVA Suit Microbial Leakage Investigation

Completed Technology Project (2015 - 2016)

Images

EVA Suit Microbial Leakage Investigation Project
EVA Suit Microbial Leakage Investigation Technology Showcase 2016 Project Poster
(https://techport.nasa.gov/image/26150)

Mark III Suit EVA Swab Test
Form, Fit, and Function Testing of EVA Swab With Mark III Suited Subject
(https://techport.nasa.gov/image/19216)

Technology Areas *(cont.)*

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.2 Extravehicular Activity Systems
    - TX06.2.2 Portable Life Support System